*****Suspended*****

Trend Study 3-19-96

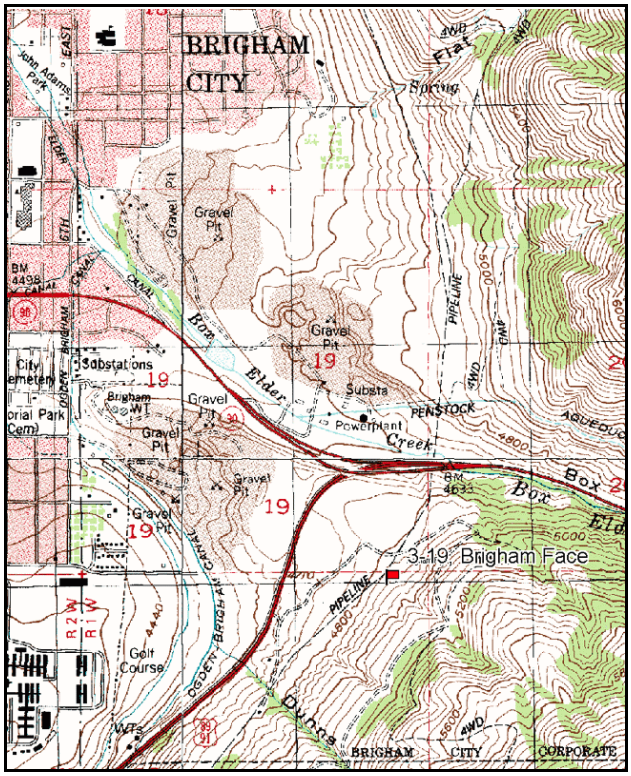
Study site name: Brigham Face . Vegetation type: Bitterbrush .

Compass bearing: frequency baseline 165 degrees magnetic.

Frequency belt placement: Line 1 (11 & 95ft), line 2 (59ft), line 3 (34ft), line 4 (71ft).

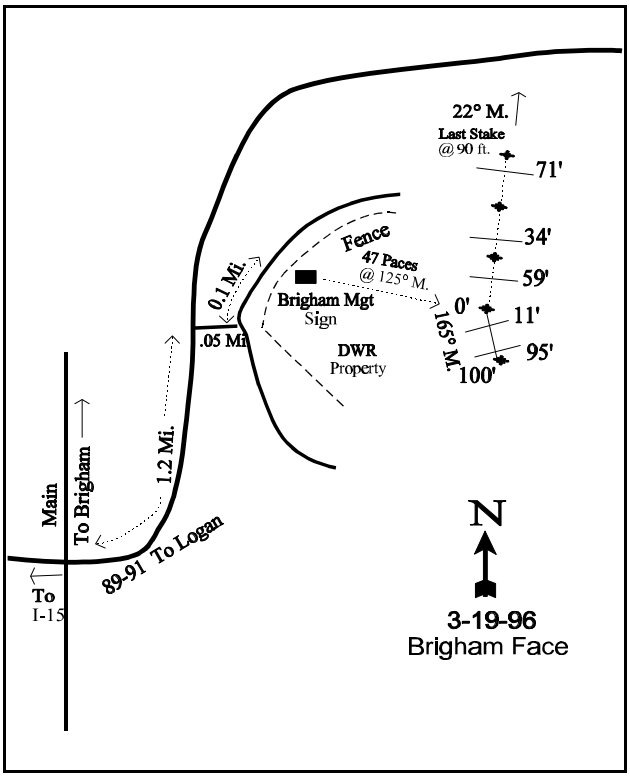
LOCATION DESCRIPTION

From 1100 South and Main Street in Brigham City, proceed northeast for 1.2 miles and turn right (east) at 1250 East. Turn left after 0.05 miles and enter DWR property. Travel 0.1 miles to the Brigham Management Area sign on the south side of the road. From the sign, walk 56 paces bearing 125 degrees magnetic to the 0-foot baseline stake. The 0-foot baseline stake is marked by browse tag # 87. The first 100 feet of the baseline runs 165 degrees magnetic. The remaining 300 feet run off the 0-foot baseline stake and run 22 degrees magnetic.



Map Name: Mantua

Township 9N , Range 1W , Section 19



Diagrammatic Sketch

UTM 4594140 N 417014 E

DISCUSSION

Trend Study No. 3-19 (2-11)

*****SUSPENDED** - This site was suspended in 2001 and will be reevaluated in 2006. The transect samples an old patch of bitterbrush that was seeded in the 1960's. This study was evaluated by the Project Leader and determined that very little or no wildlife use was present on the site due to the tall, thick nature of the bitterbrush patch that now is present. Text and data tables are included from the 1996 report.

The Brigham Face study samples what in the past was considered critical deer winter range located on Division of Wildlife Resources property on the old lake terrace immediately east of the Intermountain Indian School. The lake terrace has a gently (10%), northwest facing slope occupied by a dense stand of seeded grass interspersed by an antelope bitterbrush seeding and a persistent stand of mountain big sagebrush. Deer use was classified as moderately heavy in 1984, but current (‘96) use is light and deer pellet groups were infrequently encountered. The major impact to this area is associated with proximity to residential development and off-road vehicle use.

Soil on the site is typical of the "Wasatch" series. These are gravelly, sandy loams that most often have a gravelly subsoil. They are alluvially deposited and derived from quartzite, gneiss and schist. Wasatch soils are highly permeable and have low water-holding capacity. The erosion hazard ranges from moderate to high (Chadwick et al. 1975). At the site, effective rooting depth (see methods) was estimated at just over 12 inches in 1996. However, due to the rocky nature of the soil this estimate was limited because of the rocky subsoils, and rooting depth does not appear to be physically inhibited. Soil reaction is slightly acidic (6.2 pH). Soil texture is a sandy loam and erosion is controlled by a dense stand of seeded grass. Several roads and ORV trails in the area are the major source of soil disturbance and movement.

Browse composition consists of two species. Most conspicuous is an irregularly distributed population of a tall form of antelope bitterbrush. These were established with the aid of a "browse seeder" in the early 1960's and have since become large shrubs averaging 5 and more feet in height with a crown diameter of almost 9 feet. Total cover for bitterbrush is nearly 17%. Overall density is rather low at 580 plants/acre and the age structure suggests that bitterbrush is maintaining itself but is not apparently expanding. Utilization was heavy in 1984, when 60% of the shrubs displayed moderately heavy browsing (>60% of twigs browsed). Since then use has been classified as light.

Mountain big sagebrush also occurs on the site. Density estimates have increased from 199 plants/acre in 1984 to 1,700 in 1996. The increase in density is mostly due to the much larger sample size used in 1996, which better estimates densities of shrubs that often have aggregated and/or discontinues distributions. However, a large proportion of the sagebrush (65%) consists of small young plants. Mature shrubs number 600 plants/acre. Total cover for sagebrush is only 4%. Utilization was heavy in 1984 and percent decadence was relatively high at 50%. Since then use has been classified as light. Vigor has improved and no decadent plants were encountered on the site.

The seeded perennial grass, intermediate wheatgrass, is the principal vegetative component. It provides 31% cover or 93% of the grass cover, which accounts for over half of the total vegetative cover (56%). The only other common perennial grass is Sandberg bluegrass. Annual brome grasses which are so dominant on most sites in the unit accounts for less than 1% cover because of the competition with perennial grasses.

Perennial forbs are rare and difficult to find within the dense grass cover. All forbs combined produced less than 1% cover in 1996, only 2% of the total herbaceous cover. The tallest and most conspicuous forbs are yellow salsify and dyers woad.

1984 APPARENT TREND ASSESSMENT

Soil trend appears stable because of high quadrat frequencies for intermediate wheatgrass. Vegetative reconnaissance appears to indicate that mountain big sagebrush is probably declining in number while bitterbrush is just maintaining itself. A dense stand of intermediate wheatgrass dominates the site and will continue to do so. With the exception of mountain big sagebrush, vegetative trend is apparently stable.

1990 TREND ASSESSMENT

Browse remains limited on this DWR winter range, but both mountain big sagebrush and bitterbrush show meaningful increases. The increase in bitterbrush density is due to the high number of seedling and young plants. The sagebrush stand also has a high percentage of young plants. These shrubs have excellent vigor and show surprisingly low utilization along with very little sign of deer. Nested and quadrat frequency values for crested wheatgrass have increased a small amount, while values for intermediate wheatgrass have decreased slightly. This change would be expected because of the extended drought we are experiencing, as crested wheatgrass is more drought tolerant than intermediate wheatgrass. Still, quadrat frequency for intermediate wheatgrass is over 90%. Weedy increasers should be monitored closely, especially dyers woad, which did not appear on the 1984 survey, but had a quadrat frequency of 17% in 1990. There is still more than adequate ground cover for soil protection.

TREND ASSESSMENT
soil - stable (3)
browse - upward for key browse species (5)
herbaceous understory - stable, but weedy species should be closely monitored (3)

1996 TREND ASSESSMENT

Protective ground cover remains abundant and erosion is not apparent. Trend for soil continues to be stable. Trend for browse is stable for mountain big sagebrush and antelope bitterbrush. The respective changes in density of these two shrubs is more a reflection of the increased sample size used in 1996 than an actual increase or decrease in density. Both species are only lightly utilized, have good vigor and no decadent plants. However, the age class composition of the sagebrush would indicate an expanding population. Trend for the herbaceous understory is stable. Sum of nested frequency of grasses increased slightly, while frequency of forbs declined slightly. Nested frequency of intermediate wheatgrass increased significantly since 1990 with the frequency of Sandberg bluegrass declining significantly.

TREND ASSESSMENT
soil - stable (3)
browse - stable (3)
herbaceous understory - stable (3)

HERBACEOUS TRENDS --
Herd unit 03 , Study no: 19

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover %
		'84	'90	'96	'84	'90	'96	'96
G	Agropyron cristatum	$_{a}$3	$_{b}$19	$_{a}$1	1	8	1	.06
G	Agropyron intermedium	$_{b}$326	$_{a}$265	$_{b}$341	99	93	96	30.77
G	Bromus brizaeformis (a)	-	-	44	-	-	17	.21
G	Bromus japonicus (a)	-	-	34	-	-	14	.17
G	Bromus tectorum (a)	-	-	36	-	-	15	.32
G	Poa bulbosa	$_{a}$6	$_{b}$31	$_{b}$28	2	13	12	.24
G	Poa pratensis	-	4	-	-	2	-	-
G	Poa secunda	$_{a}$22	$_{b}$80	$_{b}$55	12	33	21	1.24
Total for Annual Grasses		0	0	114	0	0	46	0.71
Total for Perennial Grasses		357	399	425	114	149	130	32.32
Total for Grasses		357	399	539	114	149	176	33.03
F	Agoseris glauca	-	2	-	-	1	-	-
F	Alyssum alyssoides (a)	-	-	2	-	-	1	.00
F	Ambrosia psilostachya	-	-	3	-	-	1	.03
F	Collomia linearis (a)	-	-	1	-	-	1	.00
F	Cryptantha spp.	-	-	3	-	-	1	.00
F	Draba spp. (a)	-	-	10	-	-	3	.04
F	Epilobium brachycarpum (a)	-	-	4	-	-	3	.01
F	Galium aparine (a)	-	-	7	-	-	3	.16
F	Hackelia patens	-	-	4	-	-	2	.03
F	Helianthus annuus (a)	-	7	-	-	4	-	-
F	Holosteum umbellatum (a)	-	-	13	-	-	6	.03
F	Isatis tinctoria	$_{a}$-	$_{c}$42	$_{b}$19	-	17	9	.45
F	Lappula occidentalis (a)	-	-	1	-	-	1	.00
F	Lactuca serriola	$_{a}$-	$_{b}$9	$_{a}$-	-	5	-	-
F	Phlox longifolia	-	-	1	-	-	1	.00
F	Plantago patagonica (a)	-	-	7	-	-	3	.01
F	Polygonum douglasii (a)	-	-	40	-	-	18	.09
F	Taraxacum officinale	1	-	-	1	-	-	-
F	Tragopogon dubius	$_{a}$2	$_{b}$20	$_{a}$-	1	12	-	-
F	Unknown forb-perennial	-	1	-	-	1	-	-
Total for Annual Forbs		0	7	85	0	4	39	0.36
Total for Perennial Forbs		3	74	30	2	36	14	0.53
Total for Forbs		3	81	115	2	40	53	0.89

Values with different subscript letters are significantly different at alpha = 0.10 (annuals excluded)

BROWSE TRENDS --
Herd unit 03 , Study no: 19

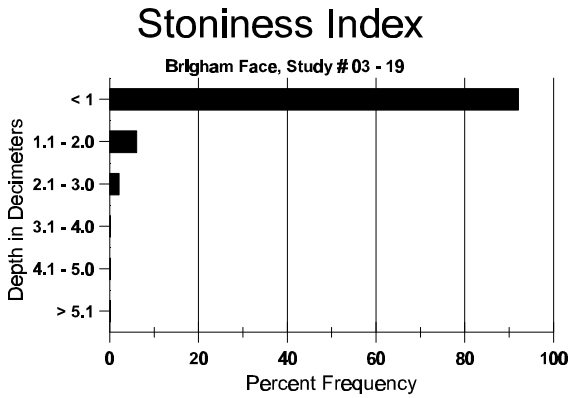
Type	Species	Strip Frequency '96	Average Cover % '96
B	Artemisia tridentata vaseyana	20	3.94
B	Atriplex canescens	2	.38
B	Chrysothamnus nauseosus albicaulis	2	.30
B	Opuntia fragilis	2	-
B	Purshia tridentata	21	16.61
Total for Browse		47	21.23

BASIC COVER --
Herd unit 03 , Study no: 19

Cover Type	Nested Frequency '96	Average Cover % '84	'90	'96
Vegetation	363	.75	10.50	55.27
Rock	83	1.50	3.25	2.13
Pavement	84	7.00	9.75	.82
Litter	399	88.75	73.00	77.75
Cryptogams	17	0	0	.30
Bare Ground	64	2.00	3.50	.63

SOIL ANALYSIS DATA --
Herd Unit 03, Study no: 19, Brigham Face

Effective rooting depth (in)	Temp °F (depth)	PH	%sand	%silt	%clay	%0M	PPM P	PPM K	dS/m
12.3	62.8 (16.0)	6.2	58.7	22.0	19.3	3.2	21.4	208.0	.5



PELLET GROUP FREQUENCY --
Herd unit 03 , Study no: 19

Type	Quadrat Frequency '96
Rabbit	5
Deer	4

BROWSE CHARACTERISTICS --
Herd unit 03 , Study no: 19

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Artemisia tridentata vaseyana																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	15	-	-	-	-	-	-	-	-	15	-	-	-	300			15
Y	84	-	1	-	-	-	-	-	-	-	1	-	-	-	33			1
	90	8	-	-	-	-	-	-	-	-	8	-	-	-	266			8
	96	55	-	-	-	-	-	-	-	-	55	-	-	-	1100			55
M	84	1	-	1	-	-	-	-	-	-	2	-	-	-	66	15	10	2
	90	1	-	-	-	-	-	-	-	-	1	-	-	-	33	30	31	1
	96	28	1	-	1	-	-	-	-	-	30	-	-	-	600	26	39	30
D	84	-	2	1	-	-	-	-	-	-	-	-	3	-	100			3
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	60			3

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	50%	33%	50%	+33%
'90	00%	00%	00%	+82%
'96	01%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	199	Dec:		50%
'90	299			0%
'96	1700			0%

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Atriplex canescens																		
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	3	1	-	-	-	-	-	-	-	4	-	-	-	80	54	41	4

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	25%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	0	Dec:	-
	'90	0		-
	'96	80		-

Chrysothamnus nauseosus albicaulis																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	11	-	-	-	-	-	-	-	-	11	-	-	-	366			11
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	1	-	-	-	-	-	-	-	1	-	-	-	20	21	28	1
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
X	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	20			1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	-89%
'96	50%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	0	Dec:	0%
	'90	366		0%
	'96	40		50%

Juniperus osteosperma																		
M	84	-	-	1	-	-	-	-	-	-	1	-	-	-	66	69	94	1
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	100%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
	'84	66	Dec:	-
	'90	0		-
	'96	0		-

AGE	YR	Form Class (No. of Plants) 1	2	3	4	5	6	7	8	9	Vigor Class 1	2	3	4	Plants Per Acre	Average (inches) Ht.	Cr.	Total
Opuntia fragilis																		
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20			1
M	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	-	0
	96	1	-	-	-	-	-	-	-	-	1	-	-	-	20	4	8	1

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	00%	00%	00%	
'90	00%	00%	00%	
'96	00%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	0	Dec:		-
'90	0			-
'96	40			-

Purshia tridentata																		
S	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	13	-	-	3	-	-	-	-	-	16	-	-	-	533			16
	96	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
Y	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	9	-	-	-	-	-	-	-	-	9	-	-	-	300			9
	96	1	1	-	-	-	-	-	-	-	2	-	-	-	40			2
M	84	-	2	3	-	-	-	-	-	-	5	-	-	-	166	58	68	5
	90	9	-	-	6	-	-	-	-	-	15	-	-	-	500	61	72	15
	96	17	1	-	-	7	-	-	-	-	25	-	-	-	500	59	105	25
D	84	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	90	-	-	-	-	-	-	-	-	-	-	-	-	-	0			0
	96	1	-	-	-	1	-	-	-	-	2	-	-	-	40			2

% Plants Showing	Moderate Use	Heavy Use	Poor Vigor	%Change
'84	40%	60%	00%	+79%
'90	00%	00%	00%	-28%
'96	34%	00%	00%	

Total Plants/Acre (excluding Dead & Seedlings)				
'84	166	Dec:		0%
'90	800			0%
'96	580			7%